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Animal Welfare Information Center Newsletter

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Legislation Update

- **H.R. 61** To improve the protection of endangered species of wildlife in units of the National Forest System, the National Park System, and the National Wildlife Refuge System by increasing the maximum fine that may be imposed for violating posted speed limits in such units.

Introduced January 3, 1991, by Charles Bennett (D-FL), and referred jointly to the Committees on Agriculture, Insular Affairs, and Merchant Marine and Fisheries. This act may be cited as the "Endangered Species Protection Act of 1991."

- **H.R. 252** To provide for the protection of veal calves.

Introduced January 3, 1991, by Charles Bennett (D-FL), and referred to the Committee on Agriculture. A calf raised for veal must be able to turn around, lie with legs outstretched, and groom itself. Calves also must be fed a daily diet containing sufficient iron and, if the calf is more than 14 days old, sufficient digestible fiber.

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ALTERNATIVES AND THE ANIMAL WELFARE ACT

by

T.D. Mandrell, D.V.M.

*Animal and Plant Health Inspection Service
Regulatory Enforcement and Animal Care*

The 1985 amendments to the Animal Welfare Act have generated much discussion and, in some cases, confusion with regard to compliance. The responsibilities of the Principal Investigator and the Institutional Animal Care and Use Committee in considering alternative methods and unnecessary duplication of research are two areas of concern. The following is a list of questions that are frequently asked by the regulated community. The answers provided are based on the regulatory requirements of the 1985 Animal Welfare Act.

Questions and Answers

"The Principal Investigator (PI) has provided written assurance that his or her research activities do not unnecessarily duplicate previous experiments." Will this statement signed by the PI satisfy the requirements or is evidence for literature review necessary?

The animal welfare regulations (9CFR Sec. 2.31 (d)(1)(iii)) state that it is the Institutional Animal Care and Use Committee's (IACUC's) responsibility to determine that the investigator has provided "written assurance that the activities do not unnecessarily duplicate previous experiments." A writ-

ten assurance consisting of a statement signed by the PI will satisfy this regulation. It is up to the IACUC, however, to determine what type of information should be included in the investigator's assurance. This may vary based on the needs and experience of the IACUC.

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Editor's Corner

The next two issues of the AWIC newsletter will address the subject of alternatives. The Center receives a large number of questions relating to this subject: Where do I find information on alternatives? How do I satisfy Animal Welfare Act requirements? What is an alternative? This issue will provide information on Animal Welfare Act requirements, regulations, and information resources.

Tim Mandrell, D.V.M. of the Regulatory Enforcement and Animal Care division of the Animal and Plant Health Inspection Service clarifies the definition of alternatives under the animal welfare regulations and answers questions that are often asked about alternatives. AWIC's Cynthia Smith provides tips on how to effectively and efficiently search for literature

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Editor's Corner Cont'd...

on alternatives. Drs. Allan Goldberg and John Frazier of the Center for Alternatives to Animal Testing at Johns Hopkins University provide an overview of an important paper on alternatives that appeared in *The Cancer Bulletin*. I recommend obtaining reprints of the article (see p. #7) for reference purposes.

Included in this issue is a "State of the Center" address from AWIC Coordinator Jean Larson. Fiscal year 1990 was a productive one with numerous information products published and phenomenal increases in use of the Center. We continue to strive for improvements and to meet the information needs of our patrons.

In closing, I would like to mention the AWIC workshop to be held in May (see Announcements p.#5). Experienced information specialists will receive training on how to: 1) retrieve database information on alternatives, 2) use AWIC services, and 3) utilize new information technologies. If you are interested in participating in the workshop contact Jean Larson at (301) 344-1215.

Alternatives Cont'd...

How does the U.S. Department of Agriculture (USDA) define alternatives?

The regulations state that the IACUC must determine whether the PI has considered alternatives to procedures that cause more than momentary or slight pain or distress to animals. Certainly, alternatives to animal use are important considerations; however, the regulations only specify alternatives to painful procedures.

What are the information sources that can be used to search for alternatives?

Library resources, computer databases, other researchers, texts, and journals are all sources which

may be used to search for alternatives.

How can an IACUC evaluate these sources?

It is not easy for the IACUC to evaluate the "written narrative description of the methods and sources used to determine that alternatives were not available." The intent of this regulation is not that the IACUC evaluate the databases or sources cited, but that the PI consider alternatives to procedures that may cause pain. Questions that should be addressed by the PI are: Is there a nonsurgical or noninvasive model? Is there a model that does not require survival surgery? Is there an in vitro model? The investigator may wish to include the following items in the narrative: the database(s) searched, the keywords used in the search, and selected references on animal models or alternatives.

How do investigators [such as individuals within the Environmental Protection Agency (EPA) or the Food and Drug Administration (FDA)] conducting testing procedures that are required by regulations consider alternatives?

The investigators in these facilities should consider alternatives as any other investigator does. However, the alternatives may not be feasible because the regulations do not allow for any alternative tests or procedures.

Is performing a published research protocol in order to ensure comparable results and technical competency considered unnecessary duplication of research?

Such replication often provides a foundation for the validation and advancement of research. The animal welfare regulations (9CFR Sec. 2.31 (d)(1)(iii)) state that it is the IACUC's responsibility to determine that the investigator has

provided "assurance that the activities do not unnecessarily duplicate previous experiments." This example is not interpreted as unnecessary duplication of research.

Is a teaching experiment considered duplicative research?

Teaching experiments are not considered duplicative because each time a procedure is performed for a new group of students or new audience, new knowledge is gained.

The principal investigator must address the areas of alternative procedures and unnecessary duplication of research and the IACUC must determine whether the issues have been satisfactorily addressed. Investigators should be aware of sources of information on alternatives and the type of information required by the IACUC. It is important that the PI and the IACUC work together to meet the regulatory requirements.

(Legislation Cont'd...)

H.R. 261 To amend the Marine Mammal Protection Act of 1972 to restrict purse seine fishing for tuna, and for other purposes.

Introduced January 3, 1991, by Barbara Boxer (D-CA), and referred to the Committee on Merchant Marine and Fisheries. This act may be cited as the "Dolphin Protection and Fair Fishing Act of 1991."

H.R. 318 To amend the Animal Welfare Act to prohibit dog racing and dog training involving the use of live animals as visual lures and to make such Act applicable to facilities that are used for dog racing or dog race training.

Introduced January 3, 1991, by Robert Dornan (R-CA), and referred to the Committee on Agriculture. This act may be cited as the "Anti-Live Animal Lure Act."

AWIC Tips for Searching for Alternatives to Animal Research and Testing

by
Cynthia P. Smith, M.S.
Animal Welfare Information Center

The first step of any search involves communication between the investigator and the information specialist. The specialist cannot effectively search for alternatives without a basic understanding of the type of research the investigator is conducting. The most efficient means of communicating is a direct dialogue between the investigator and the information specialist. A third party should not be used to convey information.

Investigators can assist information specialists by being prepared to give precise and specific information about their research or testing procedures. The following may serve as a guideline for the type of information the investigator may be asked to provide:

- What is your general area of study (*e.g.*, cardiology, neurology, toxicology, *etc.*)?
- What species are you currently working with (*e.g.*, rats, dogs, swine, *etc.*)?
- Briefly describe your experimental protocol.
- What specific systems or parts of the anatomy are involved (*e.g.*, central nervous system, brain stem, parabrachial nucleus)?
- Please give correct spellings of these structures and any acronyms (*e.g.*, CNS, PBN). European spellings are important as well.
- If you are studying the effects of a particular hormone, enzyme, or chemical agent, please give the complete spelling of the compound as well as its trade name and acronym (*e.g.*, bovine somatotropin, BST).
- Have you had any other searches conducted for you?
If so:
 What databases were used (*e.g.*, MEDLINE, AGRICOLA, BIOSIS)?
 What keywords were used (*e.g.*, kidney, parathyroid hormone)?
 What years were searched (*e.g.*, 1985-present)?
- Do you know of any prominent authors in your area of research? Have you published any previous literature that relates to your current study?
- Are you aware of any possible alternatives to your research such as experiments conducted on alternative species, cell culture, or in vitro studies?

Search Strategy

Once the initial exchange of information has taken place between the investigator and the information

specialist, the information specialist can begin to formulate a search strategy. Search strategies for alternatives can be divided into two phases, reduction and refinement, and replacement.

Phase I (Reduction and Refinement)

Phase I consists of a generalized database search used to retrieve citations pertinent to the investigator's field of study. Citations retrieved during this phase of searching may prevent the investigator from performing duplicative studies or provide information on refining experimental techniques. Phase I also serves to familiarize the information specialist with the research area. The information specialist should read several abstracts from citations retrieved during Phase I. Reading abstracts provides the information specialist with an increased understanding of the terminology used to describe the research.

During Phase I the information specialist may find it helpful to develop search strategies using databases available on Compact Disc Read Only Memory (CD-ROM). Several databases are available on CD-ROM (*e.g.*, AGRICOLA, MEDLINE, TOXLINE, and LIFE SCIENCES). Searching on CD-ROM allows the information specialist the freedom to experiment with keywords, explore indexes, and read abstracts without the pressure of being charged for online time. Searching on CD-ROM should provide the information specialist with a general idea of how much literature exists on a specific topic. If few relevant citations are found, the information specialist may need to broaden the search strategy or use the expanded capabilities of online database searching.

Phase II (Replacement)

Upon completion of Phase I, the information specialist should have a basic understanding of the research area including: 1) the literature published in the particular field, 2) the techniques used, and 3) the commonly used species. The information specialist is now ready to search for possible alternatives.

The following questions may be used to assist in the search for alternatives:

- 1) Can the product, enzyme, or tissue be tested or raised in culture?
- 2) Are there any other in vitro techniques that may reduce or replace the number of animals used?
- 3) Are there any alternative animal models (*e.g.*, invertebrates, fish, protozoa, *etc.*)?

(Cont'd p.5)

Overview of an Article on Alternatives from The Cancer Bulletin

by

Alan M. Goldberg and John M. Frazier
Center for Alternatives to Animal Testing, Johns Hopkins

From *The Cancer Bulletin*, Vol.42, No.4, 1990, "Alternatives to and Reduction of Animal Use in Biomedical Research, Education and Testing," John M. Frazier, Ph.D., Alan M. Goldberg, Ph.D., Johns Hopkins Center for Alternatives to Animal Testing, Johns Hopkins University, Baltimore.

Traditionally, whole-animal studies have provided the seedbed for biomedical progress. All three branches of biomedical endeavors--research, education, and testing--have employed whole-animal models to develop an understanding of human biology and disease.

The likelihood of implementing alternatives in each area of biomedical application--research, education and testing--differs from one area to the next. The article from *The Cancer Bulletin* explores in detail the potential of alternatives as substitutes for whole-animal models in the area of toxicity testing and product safety evaluation.

Each year thousands of chemicals undergo safety testing designed to evaluate their potential hazard from misuse or unintended exposure. Almost all of the tests take place in animals. The reactions of rats, rabbits and mice to chemicals are currently the best available predictors of the effects the substances will have on the human organism. The introduction of standardized animal testing in the United States in the 1920's was a major advance in safety evaluation, and subsequent debates about the place of animals in testing were qualified by the absence of better alternatives.

During the 1980's the issue of whole-animal use became more urgent and contentious. Animal welfare advocates have decried the suffering of millions of animals, and industries bringing products to the marketplace are concerned about the costs and delays imposed by animal testing. Meanwhile, case histories such as that of thalidomide are reminders of the consequences of

letting untested chemicals reach the marketplace. In answer to these concerns, the exploration of in vitro alternatives has become scientifically legitimate.

This exploration has yielded a new methodology known as in vitro toxicity testing. *In vitro* means "in glass," but it is generally interpreted to mean research that does not involve whole animals. In vitro systems include bacteria, cultured animal cells, fertilized chicken eggs, and frog embryos that can be employed in education, research, or testing. Ultimately workers hope to be able to study cultures of human cells from various organs and tissues.

Several factors have paved the way for the advances in in vitro testing. One is the growth of the science of toxicology itself. Today investigators understand better how toxicological processes are begun and how toxic effects can be expressed; they are not limited to death or illness as the end. Another factor has to do with technological developments of the past few years. New options in culture techniques and bioanalytical tools allow workers to monitor toxicity with unprecedented thoroughness and precision at the cellular level rather than at the organismal level.

Before discussing specific testing activities, the article provides a general classification system for understanding testing objectives. The article presents a matrix showing the various levels of information sought by toxicologists (toxic potential, potency, hazard assessment and risk assessment), plotted against the current applications of in vitro toxicity

tests, which illustrates the potential of alternatives for meeting information objectives. This demonstrates that current in vitro systems can be incorporated in toxicity testing protocols and safety evaluations, but in vitro tests are not yet advanced enough to replace fully whole-animal testing activities.

There are seven general areas of investigation in which in vitro approaches are actively being developed:

- cytotoxicity
- inflammation and irritation
- genotoxicity
- teratogenicity
- target-organ toxicity
- toxicokinetics
- structure-activity relationships.

Before any new in vitro approaches can be brought to market, they must be validated. The validation process is a meticulous and time-consuming series of logical steps. Two tiers of scrutiny are aimed at establishing the reliability of the test and developing a scientific basis for interpreting test results. The article highlights the inherent difficulties in introducing new technologies and having them accepted. It suggests, however, that cumulative experience will boost in vitro approaches over the current validation hurdles.

The article offers a short- and long-term strategy for incorporating in vitro methods in the risk assessment branch of toxicology. It projects that in the future the risk of new chemicals will be evaluated on the basis of in vitro data and structure-activity relationships rather than whole-animal methods. It should be recognized that in vitro methods act in concert with whole-animal and clinical studies to:

- Advance science;
- Develop new products and drugs; and
- Treat, cure and prevent disease.

The conclusions indicate that whether or not alternative testing will completely replace in vivo approaches is a question that only time can answer. In the meantime, alternative methods can be employed to

(Cont'd p.8)

AWIC Tips Cont'd...

- 4) Have any computer simulation models or statistical models been developed that relate to the study?
- 5) Is there literature on proper experimental design/technique that may assist the researcher in utilizing animals more effectively or in reducing the number of animals?

Information specialists should search multiple databases. AWIC provides a factsheet entitled *Databases for Biomedical, Veterinary and Animal Science Resources*. The sheet describes several databases that may be useful when searching for alternatives.

"Animal testing alternatives" is a phrase used to index citations regarding alternatives in the MEDLINE, AGRICOLA, and TOXLINE databases only. It is not a phrase used to index alternative studies in other databases such as BIOSIS, LIFE SCIENCES, and EMBASE. Although useful, this phrase should never be the only strategy used to retrieve information on alternatives. The information specialist may wish to use other terms such as tissue culture, cell culture, in vitro, simulation, and alternative.

General Comments

Searching for alternatives is not an easy task. A perfect strategy to retrieve literature regarding reduction, refinement, and replacement does not exist. Many factors may affect the outcome of a literature search, including the area of research, species involved, procedures used, chemical(s) tested, experimental design, and whether or not articles have been indexed. Additional factors include: 1) the degree of communication between the information specialist and the investigator, 2) the knowledge and educational background of the information specialist, and 3) time and money constraints.

Additional References:

*Bielenberg, K. and D. Berry. *Databases for Biomedical, Veterinary and Animal Science Resources* AWIC Fact Sheet. December 1990.

*Clingerman, K., C. Dowling, and J. Swanson. *Searching AGRICOLA for Animal Welfare* STS-03. June 1990. 20 p.

Snow, B. "Online Searching for Alternatives to Animal Testing" *Online* July 1990. p. 94-97.

*Available from AWIC

ANNOUNCEMENTS...

- Contacting AWIC via BITNET - User Name and Node: NALAWIC@UMDARS

It is now possible to contact the Animal Welfare Information Center via BITNET by sending messages to the user identification listed above.

- *The Well-being of Agricultural Animals in Biomedical and Agricultural Research*

The Well-being of Agricultural Animals in Biomedical and Agricultural Research will be published by the Scientists Center for Animal Welfare (SCAW) in April 1991. The volume contains proceedings from a SCAW-sponsored conference held in September 1990. Chapters by expert and international authors focus on topics such as: current and future regulations for agricultural research animals; animal behavior, care, and management; and Animal Care and Use Committee (ACUC) responsibilities. For more information contact SCAW, 4805 St. Elmo Street, Bethesda, MD 20814, or phone (301)654-6390.

- Hildegard Doerenkamp and Gerhard Zbinden Foundation for Realistic Animal Protection in Scientific Research Scientific Award 1991

A prize of 5,000 Deutschemarks will be awarded for outstanding scientific contributions leading to the reduction, refinement or replacement of animal use in

biomedical research or testing. The specific topic for the year 1991 is "Alternative Methods for Research on Cardiopulmonary Function and Bronchial Asthma." Applications may consist of published or unpublished reports or self-explanatory audiovisual presentations. No special application forms are required. The jury reserves the right to split the prize among not more than three applicants. Deadline for submission is December 31, 1991. Applications should be sent to:

Alan M. Goldberg, Ph.D.
Associate Dean for Research
Johns Hopkins University
School of Public Health
615 N. Wolfe Street
Baltimore, MD 21205
USA

- How to Use the National Agricultural Library (NAL) for Animal Welfare Information

The Animal Welfare Information Center (AWIC) will be sponsoring a workshop May 23-24, 1991, on utilizing the various resources and technologies available through AWIC and NAL for animal welfare information. Lectures and demonstrations will include on-line and CD-ROM database searching, tips for searching for alternatives, and the role of NAL and AWIC in assisting the regulated research community. For more information contact AWIC at (301) 344-3212.

AWIC Activities and Accomplishments in Fiscal Year 1990

by

Jean A. Larson, M.S.

Animal Welfare Information Center

Fiscal Year 1990 (FY90) was, in many respects, a very productive year for the Animal Welfare Information Center (AWIC). This article includes news about staff changes, summaries of important events, information products, and statistics on the use of the Center for FY90. A brief section will describe projects and activities planned for FY91.

Staffing

A number of staff changes have taken place. Last June, Kevin Engler left his position with AWIC to go to a management position in private industry. Kevin was a very productive member of the staff and we were sorry to see him leave. He produced several of the early bibliographies and listings, and set up, formatted, and edited the first issue of the AWIC newsletter.

Two people joined the information center staff in FY90. Cynthia Smith, who has an M.S. from the University of Illinois, works for AWIC part-time under a University of Maryland cooperative agreement. She expands the collective experience of the staff with her work experience in neuroanatomy. D'Anna Berry is the newest AWIC staff member. She comes to the Center from the National Institutes of Health (NIH), where she provided technical, post-operative, and intensive nursing care for a variety of large animals on experimental surgical protocols.

Currently, the staff includes three full-time and two part-time professionals, a secretary, and a student aid. Staffing levels are not expected to change unless there is a significant increase in the demands for service.

Accomplishments

There were many significant accomplishments in the past fiscal year:

1. One of the most important activities initiated in FY90 was the *Animal Welfare Information Center Newsletter*. The 1,300 registered research institutions and approximately 1,000 other organizations and individuals receive the newsletter. Currently, the newsletter is published quarterly and distributed free of charge.

2. In response to a request from the Animal and Plant Health Inspection Service (APHIS), the National Agricultural Library (NAL) has started to collect literature on the subjects of zoos, circuses, and captive marine mammals. These materials will be indexed for the AGRICOLA (AGRICultural On-Line Access) database.

3. The AWIC brochure describing information services has been translated into Spanish. This is the first document that NAL has produced in another language.

4. The Grants/Cooperative Agreements Program has funded three to four information products every year since 1986. Through this program, AWIC has been instrumental in providing resources for the development of needed information products. In FY90 the development of three information products were funded through cooperative agreements:

- A videotape that documents a variety of normal and abnormal behavior patterns in livestock.
- A Spanish language videotape on humane animal care and the Animal Welfare Act.
- A proceedings of a conference on agricultural animals in biomedical research.

In FY90 three products were completed, delivered, and have been made available:

1. *TOME Searcher*, an intelligent query assistant, is a software pack-

age which formulates a search strategy from natural language and is oriented for searching the AGRICOLA database.

2. *Essentials for Animal Research: A Primer for Research Personnel*, a manual by B.T. Bennett, M.J. Brown, and J.C. Schofield, was developed from the outline of a course designed for students who wanted to learn more about animal use in research. Approximately 5,000 copies have been distributed by AWIC and the American Association of Laboratory Animal Science.

3. *Humane Innovations and Alternatives in Animal Experimentation*, a notebook, has been completed and is being distributed by the Psychologists for the Ethical Treatment of Animals.

The AWIC staff has established a close working relationship with the Regulatory Enforcement and Animal Care (REAC) staff of APHIS. Literature searches, supporting documents, and training on using AWIC services have been provided to recently hired APHIS personnel.

Center Statistics

Detailed monthly statistics are kept for the number of publications distributed, conferences and meetings attended by staff, people reached at presentations, individuals requesting reference or referral services, and database searches provided as a part of the reference service.

A record number of publications were produced by the staff in FY90: 24 quick bibliographies, 6 special reference briefs, 3 AWIC series, 3 factsheets, and an update of the Search Tips series. Currently, 48 publications have been produced and are available free of charge from the Center. During the year, 29,000 publications were distributed to requestors, visitors, conferees, and workshop attendees. This repre-

(Cont'd p.7)

AWIC Activities Cont'd...

sents an increase of 235 percent over FY89.

In FY90 the staff responded to 2,700 requests for reference or referral services, representing an increase of 187 percent over FY89. In response to reference requests, a total of 391 database searches were provided free of charge.

To ensure that members of the regulated community were aware of AWIC activities and services, a number of outreach activities were undertaken. AWIC staff attended or exhibited at 10 national conferences and gave 12 invited presentations. Staff members interacted with over 3,000 individuals at these events.

Approximately 150 books and 35 audiovisuals (AV) supporting the

AWIC program were added to the NAL collection. Unfortunately, there are significant waiting lists for some of the AV materials. Extra copies will be ordered to reduce the waiting period.

Future Plans

Projects to be completed in FY91 include:

1. The development of a workshop for information providers who need training on utilizing AWIC and NAL for information. If the workshop is well received by the first attendees, the class will be made available to other regions of the country (see Announcements, p.#5, for more details).

2. The development of informational materials on the psychological well-being of primates and exercise in dogs. This is a cooperative project

with the National Library of Medicine and the National Institutes of Health (NIH), Office for Protection from Research Risks.

3. The printing and distribution of a document on water quality for captive marine mammals (a cooperative project with APHIS).

4. The continuation of a modest Grants/Cooperative Agreements Program for the development of relevant information products. (Please contact the author for more information.)

The AWIC program provides a valuable service to the regulated community; however, there is always room for constructive change. Please contact AWIC regarding any ideas for improving service and identifying information needs.

Upcoming Meetings...

Scientists Center for Animal Welfare (SCAW), "The Care and Use of Amphibians, Reptiles and Fish in Research," April 8-9, 1991. New Orleans, LA. Contact: (301) 654-6390.

New England Regional Conference, "Bioengineering of New Animal Food Sources," April 9-10, 1991. Storrs, CT. Contact: (202) 486-3231.

Eastern Psychological Association, Inc., 62nd Annual Meeting, April 11-14, 1991. New York, NY. Contact: (609) 863-6366.

Center to Study Human-Animal Relationships and Environments (CENSHARE) and University of Minnesota, "The Ethics of Humans Using Animals for Food and Fiber," April 18-19, 1991. St. Paul, MN. Contact: (612) 624-2268.

Federation of American Societies for Experimental Biology (FASEB), April 21-25, 1991. Atlanta, GA. Contact: (301) 530-7010.

Fidia Research Foundation, "Ethical Issues in Research," April 29-30, 1991. Washington, DC. Contact: (202) 337-7185.

NIH Regional Workshop on Implementation of the Public Health Service Policy on Humane Care and Use of Laboratory Animals, May 2-3, 1991. Sponsor: Washington University School of Medicine. Contact: (314) 362-6891 or 800-325-9862.

International Business Communications (IBC), "Reducing the Use of Whole Animals in Testing with Computer Technology and In Vitro Models," May 8-9, 1991. New Orleans, LA. Contact: (508) 650-4700.

American Registry of Professional Animal Scientists (ARPAS) Annual Chapter Symposium, "Interfacing Environmental Issues with Animal Agriculture," May 9, 1991. College Park, MD. Contact: (301) 295-8638.

International Association for Aquatic Animal Medicine (IAAAM) 22nd Annual Conference, May 12-16, 1991. Marineland, FL. Contact: (415) 881-3422.

The 23rd Annual Laboratory Animal Medicine Conference, "Laboratory Animal Facility Management," May 23-24, 1991. Cincinnati, OH. Contact: (513) 558-5171.

Medical Library Association (MLA) 91st Annual Meeting and Exhibit, May 31-June 6, 1991. San Francisco, CA. Contact: (312) 419-9094.

Animal Behavior Society (ABS) Annual Meeting, June 1-6, 1991. Wilmington, NC. Contact: (919) 395-3371.

1991 World Congress on Cell and Tissue Culture, June 16-20, 1991. Anaheim, CA. Contact: (301) 992-0946.

Agri-tech '91, July 10-12, 1991. Blacksburg, VA. Contact: (703) 231-7850.

NEW PUBLICATIONS AND UPDATES...

- *Sheep and Goat Housing and Facilities* QB 91-22
- *Bovine Spongiform Encephalopathy* SRB 91-05
- *The Draize Eye-Irritancy Test* SRB 91-03
- *Serials in the National Agricultural Library Relating to Animal Care, Use, and Welfare* AWIC Series #5
- *Animal Welfare Legislation: Bills and Public Laws, 1990* AWIC Series #4 (Annual Report)
- *Centro de Informacion para el bienestar de los Animales* (Spanish Version of AWIC Brochure)
- *AWIC User Tips* AWIC Fact Sheet
- *Contacting AWIC* AWIC Fact Sheet
- *AWIC Files on ALF* AWIC Fact Sheet

Overview Cont'd...

improve predictive toxicology and, simultaneously, to reduce pain and distress in animals.

Johns Hopkins Center for Alternatives to Animal Testing

A combination of programs at Johns Hopkins Center for Alternatives to Animal Testing (CAAT) has proven successful in promoting the development of the new science of in vitro technologies, as well as increasing awareness about animal testing issues within scientific and public sectors.

The mission of the CAAT is to:

- Develop, to the extent consistent with the public's health and safety, in vitro alternatives to the use of whole animals in evaluating commercial and therapeutic products. Alternatives are new tests that refine existing ones or reduce or replace whole animal tests.

- Validate alternative methods and encourage their use.
- Disseminate scientifically correct information about alternatives and their use.

Sections of this article were taken from "Alternatives to Animals in Toxicity Testing," Alan M. Goldberg and John M. Frazier. *Scientific American*, August 1989, Vol. 261, No. 2, pp. 24-30.

For copies of *The Cancer Bulletin* issue containing this article, send \$5 plus postage and handling to Speco Graphics, *The Cancer Bulletin*, Office of Special Publications-227, The University of Texas M.D. Anderson Cancer Center, 1515 Holcombe Blvd., Houston, TX 77030.

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